Foreign Exchange Rates and Infrastructure Development in Nigeria

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Abstract
Purpose *– Infrastructural development is germane for the socioeconomic growth of nations. Nigeria's infrastructural deficit has been attributed to poor infrastructure planning, mistiness in public procurement, over-dependence on oil revenues and fluctuating exchange rate. The purpose of the study is to examine the relationship between foreign exchange rate and cost of road infrastructural development in Lagos State.*
Design/methodology/approach *– A quantitative research approach was adopted in the study. Data on cost of road infrastructure in Lagos was gathered from the archives of registered Lagos Sate civil engineering consultants and contractors. Data on foreign exchange rate was obtained secondarily from the publications of the Central Bank of Nigeria (CBN) and Nigeria Bureau of statistics using a data collection proforma for a period of seventeen years spanning from 2000 to 2016, indicating the inception of democracy in the Nigerian political agenda and the end of military rule in Nigeria.*
Findings *– Fluctuation in foreign exchange rate had 49.6% impact on the cost of road infrastructural development and is responsible for the high cost of infrastructural development in Nigeria.*
Research limitations *– Only Road infrastructure project cost for Lagos, Nigeria was considered in the study*
Theoretical/Social/Practical implications *– Unstable foreign exchange rate directly affects cost of road infrastructure, resulting in increased cost while widening the infrastructure deficit.*
Originality/value *– Periodic study of foreign exchange rates and its attendant implications for infrastructure development can provide policy direction towards closing the infrastructural deficit in Nigeria*

Keywords*: Fluctuation, Foreign exchange rates, Infrastructural development cost, Roads, Lagos state*

1.0 Introduction
The foreign exchange rate affects every fiber of the Nigerian economy due to the gross import-dependent nature of major commodities. The price at which a country's currency is expressed in terms of another country's currency is termed the foreign exchange rate. Prevailing foreign exchange rate affects investment decisions (Genc and Artar, 2014). The implication is evident in infrastructure development. Various industries are affected differently by the rate of foreign

exchange. Agricultural products that are solely grown in Nigeria are affected by exchange rates due to the resultant impact of foreign exchange rates on transportation costs and other raw materials. The construction and infrastructure development sector is also affected by fluctuations in exchange rates due to the high import dependence of modern construction processes.

As the world population increases there is an unprecedented demand for infrastructural development. Despite estimated investments of $2.5 trillion annually on infrastructure worldwide, Woetzel et al, (2017) agreed that countries will have to contend with the challenge of infrastructure deficit between 2030 and 2040. This is further emphasized by the World Bank's (2017) position that developing economies account for about 60 to 70 percent of the global infrastructure deficit. With worsening infrastructural deficit in the global South where major input materials for infrastructure development are import-dependent and foreign exchange rates impacted, there is a clear need to tackle critical variables affecting infrastructural deficit. Although Jessop (2017) stated that the annual global infrastructure spending needs to rise from 3 to 3.5 percent of global gross domestic product, Upbin (2016) opined that there should be a global rise to 3.8 percent of global GDP on infrastructure spending and capital projects.

The reality of the global infrastructure deficit and the slow traction of developing economies to bridge their infrastructural gap requires a multidimensional approach toward lasting solutions. Idowu et al (2017), opines that Nigeria needs to invest about $ 3 trillion in infrastructure projects in the next 30 years. to attempt to bridge its infrastructural deficit. Considering the enormity of infrastructure costs, there is a need for cooperation between the public and private sectors in providing sustainable infrastructure to bridge the infrastructure deficit. However, the huge capital outlay for infrastructure development is further exasperated by the widening and unstable foreign exchange rate of US Dollars to Naira.

Although several factors have been attributed to Nigeria's inability to actualize rapid infrastructure development. Fluctuating exchange rates, unclear or unavailable infrastructure development agenda, murkiness in public procurement processes, poor accountability in government expenditure, discord among government ministries, departments, and agencies over infrastructure development priorities, and over-dependence on oil revenue affect infrastructure development. Fluctuating foreign exchange rate is a critical factor in infrastructure development (Opaluwa et al, 2010), particularly as it determines the behavior of several macroeconomic variables affecting infrastructure development. Eze and Markjackson (2020) argue that the volatility of foreign exchange rates results in economic uncertainties and risks. Infrastructure development is worse hit by risks triggered by fluctuating exchange rates. The severity of the fluctuation in foreign exchange rates affects economic variables such as a sudden upward increase in the price of foreign currencies, an increase in the cost of construction materials and labor costs, and an overall increase in the production cost of infrastructural development. macroeconomic variables. According to Amiti (2014), the exchange rate directly affects domestic prices through marginal cost and mark-up. In agreement, Ezeokwonkwo (2010), posits that particularly affecting the inputs required to implement a project are construction materials and components. The prices of these materials in turn affect the cost of the project.

Infrastructure development in Nigeria is plagued with increasing demand for import-based input materials whose costs are influenced by foreign exchange rates. The construction industry involved

in critical infrastructure development such as road works is not exempted from the demand for import-based input materials which constitute major construction materials and components. This further deepens the challenges of Nigeria's infrastructure deficit with the attendant issues of poor project performance, poor project budget control, time overruns, increasing rate of abandoned projects and change in scope of ongoing infrastructure development projects. Given the factors identified, this study evaluates the effect of the exchange rate on road infrastructure development in Nigeria.

2.0 Literature Review

The history of fluctuation in exchange rates in Nigeria is traceable to the collapse of the Bretton Woods System resulting in high volatility and difficulty in forecasting foreign exchange rates (Abina & Mogbeyiteren, 2021). Abina (2023) argued that both fixed and fluctuating exchange rate regimes presented varying impacts on the economy. Whereas fixed foreign exchange rate resulted in reduced return on investment and increased cost of hedging, fluctuating foreign exchange rate affects price volatility. One of the major implications of such price volatility on infrastructure development projects is poor cost performance. Otti, (2012) & Ijigah et al., (2012) agreed that high construction costs have been a major challenge to infrastructure development projects in Nigeria. Mansfield et al (1994) further concluded that the cost overruns in construction projects are also caused by price fluctuation.

Fluctuation in foreign exchange rates affects multiple variables in infrastructure development. Aminu (2013) suggested that the risk of fluctuation in the price of construction materials used for infrastructure project development is the most occurring project risk in Nigeria. An unstable foreign exchange rate is a predominant cause of fluctuation in the prices of construction materials.

Sean, Pastpipatkul and Boonyakunakorn (2019) evaluate the relationship between money stock, rate of inflation, and foreign exchange rate in Cambodia. Using the Bayesian vector autoregressive model Time series, the study collected monthly data spanning October 2009 to April 2018. The study found that money stock presented a positive effect on foreign exchange rates and inflation in Cambodia, resulting in general price level increases.

Monfared and Akın (2017) studied the relationship between foreign exchange rates and inflation in Iran. The study collated historical data from 1976 to 2012 and analyzed the data based on the Hendry model and vector autoregressive model. The results showed a linear relationship between the foreign exchange rate and inflation in Iran. Further, the study introduced an additional explanatory variable using the vector autoregression (VAR) model, which showed that foreign exchange rate and money stock had a linear relationship with the prices of goods and services in Iran.

Bobai, Ubangida, and Umar (2013) utilized data spanning 1986 to 2010 to examine the relationship between exchange rate fluctuation and inflation in Nigeria. The result of the study which deployed the vector error correction technique showed that inflation bears a nonlinear impact on foreign exchange rate. This implies that an increase in the general price level results in a decrease in the foreign exchange rate in Nigeria.

Wogu and Kalu (2011) recommended that speculation among commercial property developers affects construction prices. Most property investments provide investors with stable, bond-like income from contractual leases (Ciochetti, Fisher, and Gao, 2003). This is on account of business properties that are for the most part involved by occupants that have long-term leases making income fair and predictable notwithstanding amid economic downturns.

Joseph and Akhanolu (2011) argued that numerous economists agree that the floating exchange rate framework in operation since the post-Bretton Woods period has caused considerable unpredictability in economies. Adamu (2005) found a negative impact of exchange rate instability on private investments. Mordi (2006) while utilizing the generalized autoregressive conditional heteroskedasticity (GARCH) model stated that the inability to manage exchange rates can distort and result in risk with a destabilizing impact on the economy.

Olowe (2009) found that the Structural Adjustment Program (SAP) in Nigeria in 1986 resulted in the deregulation of the foreign exchange market and the introduction of a market-determined exchange rate, a floating rate regime that has expanded vulnerability in the exchange rate along these lines expanding its instability. The unpredictability, recurrence, and volatility of the exchange rate development since the start of the floating exchange rate directly affect infrastructural developments in Nigeria. Dahiru and Joseph (2013) identified the foreign exchange rate and its instability as key factors affecting Nigeria's economy.

Attela, Atzeni, and Belvisi (2003) observed that exchange rate instability determines the vulnerability of expected profit. However, the degree and the ramifications of this relationship remain an empirical inquiry. Engle and Patton (2001) opined that foreign exchange rate instability presents unpredictability among economic variables.

Liu and Mei (1998) found that inflation benefits are observed to be determined by unexpected returns which are partially determined by changes in exchange rate risks. Barry, Rodrguez, and Lipscomb (1996), have investigated the expansion capability of real estate investors in developing markets and they opined that infrastructure development is generally riskier. Property and project market in Nigeria as a rising economy should offer enhancement advantage to foreign investors, consequently the need to consider the impact of exchange rate on the cost of infrastructural development in Nigeria.

Jurion (1990) opined that an unstable exchange rate could raise strategic and administrative issues since it could prompt gains or losses. Since currency variance can affect domestic and global prices of materials, it is essential to evaluate its consequences on projects. Olowe (2009) noted that the Nigerian foreign exchange market is portrayed by high unpredictability; consequently, there is the need to decide how this instability of the exchange rate (US dollar to Nigerian naira) influences project investment in Nigeria.

Previous studies are rife with the economic implication of fluctuation in foreign exchange rates on infrastructure development generally. This study seeks to unravel the impact of foreign exchange rates on road infrastructure in Lagos State at the outset of democracy in Nigeria.

3.0 Research Methods

The research methodology adopted in this study aligns with the research peculiarities for studies in construction economics and particularly for the analysis of time series data on foreign exchange rates of the Nigerian Naira versus USD, for the underlying understanding of the relationship between foreign exchange rate and road infrastructure development cost in Lagos, Nigeria. The research approach was quantitative. The econometric research method was explored to achieve study objectives.

Data on road infrastructural projects in Lagos State during the study period of the year 2000 to 2016 were used. The choice of Lagos State as the study area was because of the volume of ongoing road infrastructural development. Road construction has been a cardinal focus of the Lagos state government.

The study variables for this research include selected macroeconomic variables and the cost of select road projects in Lagos. EXG= Foreign exchange rate, GDP is the real Gross Domestic Product (GDP growth (annual %)), IFR = Inflation on consumer prices (annual %), PC= Project Cost, CCI= construction cost indices, Building Cost Index (BCI), Labor Index (LI), Material Index (MI) and Equipment Index (EI) are macro-economic variables used in the study.

The cost of road projects in Lagos was gathered from civil engineering consultants and contractors who have worked with Lagos State ministries, departments, and agencies (MDAs) on road projects. Data were also sourced from some Lagos State MDAs. Macroeconomic variables data were obtained secondarily from the publications of the Central Bank of Nigeria (CBN), the Nigeria Bureau of Statistics, the World Bank, and the United Nations. Data collection was gathered from 2000 to 2016 (17 years) which represents the inception of democracy in Nigeria. The choice of 2000 as the base year for the study was due to the availability of road project cost data in Lagos.

The model deployed in the research is based on the structural macroeconomic model of Khan and Knight (1991), Dada and Oyeranti (2012), and Olushola and Adebukola (2016). The model focused on the relationship between foreign exchange rates and road infrastructure project cost. The output equation expresses real GDP as a function of monetary and fiscal variables such that;

$LRGDP_t = \beta_0 + \beta_1 LM_{st} + \beta_2 LEXR_t + \beta_3 LNEX_t + \beta_4 LINF_t + \beta_5 LTGE_t + \varepsilon_t \dots$ (1)

The impact of exchange rate on project cost in Nigeria considers the following variables:
EXG= Foreign exchange rate,
GDP which is the real Gross Domestic Product (GDP growth (annual %))
IFR = Inflation consumer prices annual%
PC= Project Cost
CCI= construction cost index
Building Cost Index (BCI)
Labour Index (LI)
Material Index (MI)
Equipment Index (EI).
It can be summarized as follows:

LOG (EXG) = f (GDP, IFR, PC, CCI, BCI, LI, MI, EI)…………..……..……………….. (2)

D EXG = f (GDP, IFR, PC, CCI, BCI, LI, MI, EI)……………………..…………………… (3)
Thus, our growth function becomes:
LOG (EXG) = β0+ β1 GDPD + β2 IFR + β3 PCD + β4 CCI + β5 BCI + β6 LI
 + β7 MI + β8 EI……………………..……………………………. …………………. (4)
D (EXG) = β0+ β1 GDPD + β2 IFR + β3 PCD + β4 CCI + β5 BCI + β6 LI
+ β7 MI + β8 EI + Ut…………………………………………………………...…… (5)
Where:

The first difference of EXG= Foreign exchange rate, GDP which is the real Gross Domestic Product (GDP growth (annual %)), IFR = Inflation consumer prices annual%), PC= Road infrastructure Project Cost, CCI= construction cost indices, Building Cost Index (BCI), Labour Index (LI), Material Index (MI) and Equipment Index (EI)) were used to ensure that data is stationary and spurious results are not gotten.

From the specified model equation above, the dependent variable is EXG i.e. endogenous variable and the exogenous variables are GDP, IFR, PC, CCI, BCI, LI, MI, EI.

4.0 Analysis and Discussion

The five independent variables of the study are CCI= construction cost indices, Building Cost Index (BCI), Labour Index (LI), Material Index (MI), and Equipment Index (EI) which are used for the determinants of foreign exchange rate fluctuations on projects in Nigeria are slightly correlated with the foreign exchange rate. This is because the correlation (R) for this research is 0.992, and the coefficient of determination (R2) is 0.984% for the examined regression model.

Table 1: Summary of Multiple Regression result for determinants of foreign exchange rate fluctuations on projects in Nigeria

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.992(a)	.984	.971	49.4

a Predictors: (Constant), Equipment Index (EI), CCI= construction cost indices, Material Index (MI), Labour Index (LI), Building Cost Index (BCI)
b Dependent Variable: Exchange Rate

From the analysis, it means the regression line could significantly account for 49.6% of the total variations in determining foreign exchange rate fluctuations on projects. In contrast, it shows that 41.4% of the variation of the project could not be estimated by the specified model. Therefore, other variables not captured in this study are also important in explaining project cost performance. Hence, the results show that 41.4% of the variances in the exchange rate have been slightly significantly explained by CCI= construction cost indices, Building Cost Index (BCI), Labour Index (LI), Material Index (MI), and Equipment Index (EI). The adjusted R2 of 0.971 in Table 1 indicates only a slight overestimate in this model. This is because the correlation (R) for this research is 0. 984 and the coefficient of determination (R2) is 0. 971% for the examined regression model. Hence, the results show that 49.4% of the variances in the project cost have been slightly significantly explained by the three independent variables.

Table 2: Multiple Regression (Coefficients) result for determinants of foreign exchange rate fluctuations on projects in Nigeria

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	12509.621	15659.341		.799	.441
	Building Cost Index (BCI)	15.905	15.163	.561	1.049	.317
	Labour Index (LI)	7.059	20.288	.148	.348	.734
	Material Index (MI)	-20.557	42.097	-.172	-.488	.635
	Equipment Index (EI)	-56.425	59.467	-.237	-.949	.363
	CCI= construction cost indices	33.580	13.305	.577	2.524	.028

a. Dependent Variable: Project Cost

Determinants of foreign exchange rate fluctuations which are Building Cost Index (BCI), Labour Index (LI), Material Index (MI), Equipment Index (EI) and CCI= construction cost indices on projects in Nigeria.

$Y = a + \beta_4 CCI + \beta_5 BCI + \beta_6 LI + \beta_7 MI + \beta_8 + EI + e$

Y= Project Cost

a = constant

X1 = Building Cost Index

X2 = Labour Index

X3 = Material Index

X4 = Equipment Index

X5 = Construction cost indices

b = regression of coefficient of Xi,

i= 1, 2, 3, 4, 5

e = an error term, normally distributed of mean 0 (usually e is assumed to be 0)

Y (project cost) = 0. .441 + 0.561 (Building Cost Index) + 0. 317 (Labour Index) + 0. 734 (Material Index) + 0. 635 (Equipment Index) + 0. 363 (Equipment Index) + 0. 028 (Construction cost indices) The five independent variables which are: the Building Cost Index (BCI), Labour Index (LI), Material Index (MI), Equipment Index (EI), and CCI= construction cost indices are the determinants of foreign exchange rate fluctuations on Projects in Nigeria.

Building Cost Index (BCI) has a significant impact on foreign exchange rate fluctuations for project cost since the t= 1.049, p= 0. 317, b1= 0. 561. This means that for every one-unit increase in the Building Cost Index (BCI), its determinants of foreign exchange rate fluctuations project cost will increase by 0.561 units.

Labour Index (LI) is a significant determinant of foreign exchange rate fluctuations project cost since the t= 0.348, p= 0. 734, b2 = 0. 148. This indicates that for every one unit increase in project cost, its determinants of foreign exchange rate fluctuations project cost will increase by 0.148.

Material Index (MI) influences foreign exchange rate fluctuations on project cost. From the results gain, t= -.488, p= 0. .635, b3 = -.172. Thus, it shows that for every one-unit increase in Material Index (MI)), determinants of foreign exchange rate fluctuations will decrease by -.172.

Equipment Index (EI) is the significant determinant of foreign exchange rate fluctuations on cost since the t= 0. -.949, p= 0. .363, b2 = 0. -.237. This indicates that for every one-unit increase in the

Equipment Index (EI), the determinants of foreign exchange rate fluctuations on project cost will decrease by 0. -.237.

Finally, the table, shows that CCI= construction cost indices have the determinants of foreign exchange rate fluctuations on project cost. From the results gain, t= 2.524, p= 0. .028, b3 = 577. Thus, it shows that for every one-unit increase in Material Index (MI)), determinants of foreign exchange rate fluctuations will decrease by 0.577.

Construction costs form part of the overall costs incurred during project construction. Very broadly, construction costs will be those costs incurred by the actual construction works themselves. the actual construction cost of a project though clearly defined at the initial stage may not be finally determined until well after the actual construction works have been completed this is greatly influenced by foreign exchange rate fluctuation. The fact that the foreign exchange rate is ever fluctuating contributes towards change in construction cost which often is on the increasing side. Should there be a demand for increased cost as necessitated by the construction, the project is affected. As the foreign exchange rate fluctuates, there may be an increased construction cost on the project. Aibinu and Jagboro (2002) detected that an increase in the prices of building materials due to foreign exchange rates has multiplier effects on the industry as it leads to fluctuation in construction costs and the eventual abandonment of projects.

The building cost index is an index of input prices that describes the production, materials, wages and salaries, and other inputs of the building. Building cost index is relative to foreign exchange rate fluctuations on projects. This is because inputs required in building construction are imported. As the exchange rate fluctuates, it impacts the prices of these inputs. When fluctuation is high, the price of input materials also increases and when reduced fluctuation is negative. Anosike, (2009); Mekson, (2008) opine the cost of building materials poses a significant threat to both the construction industry and people aspiring to own houses. Akanni, Oke, & Akpomiemie, (2014) affirmed that an increase in prices of construction materials results in time overrun. Besides timely completion, high prices of building materials form a crucial constraint to improving housing conditions in low-income earning countries, Nigeria inclusive (United Nations Centre for Human Settlement [UNCHS], 1993).

Labor index is an important requirement in project construction and cannot be ignored in the overall construction process. However, the foreign exchange rate does have a way of determining the labor index employed in a project. An increase in the foreign exchange rate reduces the competitiveness of foreign producers in domestic markets. In other words, foreign exchange rate fluctuations have significant long-term effects on the labor input of projects, and the effect is stronger for trade-oriented industries. According to Aibinu, Jagboro, (2002) workers will agitate for an increase in their wages because the present pay packet is no longer sustainable. The cost of the project will rise and those who had the intention of embarking upon new projects will suspend it. The result is a reduction in the tempo of construction activities.

Material Index is a major issue that calls for attention when implementing project construction. Construction projects involve extensive use of materials. As it were, projects thrive on material and equipment inputs in construction, playing a crucial role in the construction process. No project could be completed outside the use of materials and equipment. However, a high percentage of

materials used in carrying out project construction are imported and also subject to the law of demand and supply. As project construction increases, the need for material and equipment use increases; whereas the price attributed to the materials and equipment is determined by foreign exchange rate fluctuation. As the foreign exchange rate increases, the prices of construction materials and equipment increase. According to Obiegbu (2003), materials needed for erecting and completing construction works could amount to about 35-60 percent of the total project cost. Anosike, (2009) posits that over the past 10 years, there has been a dramatic increase in the costs of building materials in Nigeria, and this development threatens the performance of the construction industry.

The model summary of the multiple regression equation that predicted the significance of the regression model is shown in Table 3. The independent variables of Inflation consumer prices annual %), Exchange Rate, and GDP Growth Rate account for 15.4 percent of the variance in project cost. The table provides useful information about the regression analysis. First, the 'multiple r' column has the relationship between the observed independent variables and the predicted dependent variables predicted by the regression equation (Inflation consumer prices annual %), Exchange Rate, GDP Growth Rate). R2 is the square of R and is also known as the 'coefficient of determination'. It states the proportion (or percentage) of the (sample) variation in the dependent variable that can be attributed to the independent variables. In this study, 15.4% of the variation in project cost appears to be a significant relationship between Inflation consumer prices annual %), Exchange Rate, and GDP Growth Rate.

Table 3: Summary of Multiple Regression result for macro-economic variables and its effect on the project costs in Nigeria

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.392(a)	.154	.042	7.231

a Predictors: (Constant), IFR = Inflation consumer prices annual %), Exchange Rate, GDP Growth Rate   b Dependent Variable: Project Cost

The 'adjusted R2' refers to the best estimate of R2 for the population from which the sample was drawn. Finally, the 'standard error of estimate (SE)' indicates that, on average, Inflation consumer prices annual %), Exchange Rate and GDP Growth Rate deviate from the predicted regression line by a score of 7.23. Based on this, the Adjusted R Square adjusts for a bias in R Square. R2 is sensitive to the number of variables and scores therefore, adjusted R2 corrects the sensitivity of R2. The standard error of the estimate measures the variability of the relationship.

Based on the Model Summary table, the three independent variables which are Inflation consumer prices annual %), Exchange Rate, and GDP Growth Rate are slightly correlated with the dependent variable project cost. While the correlation (R) for this research is 0.392, the coefficient of determination (R2) is 0.154% for the examined regression model.

From the analysis, it means the regression line could significantly account for 15.4% of the total variations in project cost. In contrast, it shows that 74.6% of the variation in project cost could not be presented by the equation. This means other additional variables are important in explaining infrastructure development costs that have not been covered by these studies. Hence, the results

show that 15.4% of the variances in the project cost have been slightly significantly explained by the three independent variables.

In general, the R2 value is a statistic that will give information regarding the goodness of fit of the model. It will increase when there are more independent variables added to the multiple regression models. However, for this situation, analysts should use adjusted R2 so that it will be easy to compare the explanatory power of regression models with the different numbers of independent variables (Hair, Money, Samuel, Page, 2007). The adjusted R2 will bring more accurate results for this situation because it is adjusted according to the number of independent variables in the model. In addition, the adjusted- R square can avoid overestimating the impact of adding an independent variable into the multiple regression model. From Table 1, the adjusted R2 is 0.042 indicating only a slight overestimate in this model.

The F value of 9.787 is significant at the 0.05 level. This is because the p-value is 0.00 which is less than 0.05 ($p < 0.05$).

Table 4: Multiple Regression (ANOVA) result for macro-economic variables and its effect on the project costs in Nigeria

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1231936.293	3	410645.431	9.787	.522(a)
	Residual	6781851.979	13	521680.921		
	Total	8013788.272	16			

a Predictors: (Constant), IFR = Inflation consumer prices annual %), Exchange Rate, GDP Growth Rate   b Dependent Variable: Project Cost

Inflation consumer prices annual %), Exchange Rate, and GDP Growth Rate were suitable in explaining the variation in project cost. This implies that macroeconomic variables have a significant effect on the project costs in Nigeria.

Table 5: Multiple Regression (Coefficients) result for macro-economic variables and its effect on the project costs in Nigeria

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	179.834	1246.891		0.144	.888
	Exchange Rate	4.359	7.311	.358	0.596	.561
	GDP Growth Rate	-28.300	25.874	.292	1.094	.294
	IFR = Inflation consumer prices annual %)	34.266	47.934	.114	.715	.487

a Dependent Variable: Project Cost
Using the equation below:

Y= a + β1 EXG + β2 IFR + β3 GDPD + e
Y= Project Cost
a = constant
X1 = Foreign exchange rate
X2 = Real Gross Domestic Product (GDP growth (annual %)
X3 = IFR = Inflation consumer prices annual%)
b = regression of coefficient of Xi,
i= 1, 2, 3
e = an error term, normally distributed of mean 0 (usually e is assumed to be 0)
Y (project cost) = 0.888 + 0.561 (Foreign exchange rate) + 0.294 (Real Gross Domestic Product (GDP growth (annual %) + 0.487 (IFR = Inflation consumer prices annual %)

Based on the Coefficient table, the Exchange Rate has a significant relationship with project cost since the t= 0.596, p= 0. 561, b1= 0. 358. This means that for every one-unit increase in Exchange Rate, the project cost will increase by 0.561 units.

Besides, for GDP Growth Rate also has a significant relationship with the project since the t= 1.094, p=.294, b2 = 0. 292. This implies that for every one-unit increase in project cost, it will increase the project cost by 0.292.

IFR = Inflation consumer prices annual (%) also has a significant relationship with project cost. From the results, t= 0.715, p= 0. 487, b3 = .114. For every one unit increase in IFR = Inflation consumer prices annual %), project cost will decrease by 0.487.

According to the result, it shows that Exchange Rate has a higher beta value (b= 0.358) compared with GDP Growth Rate (b= 0. 292) and IFR = Inflation consumer prices annual %), (b= 0.114). Thus, it can be concluded that the Exchange Rate as one of the macro-economic variables has the strongest effect on project cost. Exchange Rate plays the most important predictor compared to other macro-economic variables on the project costs in Nigeria.

Inflation depicts an economic situation where there is a general rise in the prices of goods and services, continuously. Unevenly rising prices inevitably bring about increased project costs distorting purchasing power. When there is inflation, the currency loses purchasing power. The purchasing power of a given amount of the naira will be smaller over time when there is inflation in the economy. for the fact that most inputs required in a project are imported, During inflation, the importee tends to be on the gaining side while the country engaging in export has to bear the brunt of increasing payment. This invariable contributes towards a continuous increase in the total cost incurred in completing a project. During inflation, contractors pay more to get the required project input. When compared with a situation where inflation is absent, prices are stable. Ayodele, Alabi, (2011) noted that the devaluation of the Naira has shaken up the prices of imported construction materials. The implication is that projects under construction will have their contract sums reviewed upwards due to obvious inflationary trends.

Foreign exchange rate attracts so much attention from the construction industry going by its potential to determine the amount that would be incurred in procuring construction materials and equipment needed to complete a particular construction project. The exchange rate could be fixed, but as it were with Nigeria, the price of the currency when expressed in terms of the currency of other nations from where materials are sorted; is ever on the high side. Over time the value loss in the currency has resulted in spending so much to acquire the needed material input in the project,

thereby adding to project cost at an increasing rate. The naira is overvalued, and the external sector remains competitive. Aliyu (2011) contends that appreciation of the exchange rate brings about increased imports and reduced exports while depreciation expands exports and discourages imports.

The effect of exchange rate fluctuations on gross domestic product (GDP) is important. The gross domestic product (GDP) is one of the primary indicators used to gauge the health of a country's economy. It represents the totalollar value of all goods and services produced over a specific period. The GDP is often used to measure the size of the economy. A substantial change in GDP, whether up or down, usually has a significant effect on the price of products generally, having a link with inflation. However, with an increase in the exchange rate, the cost of imported parts and equipment and investment costs will rise, which reduces production. Expected fluctuations in the foreign exchange rate would have a definite impact on GDP. Infrastructure development costs increase with high foreign exchange rates. Rasaq (2012) demonstrates that exchange rate instability impacts GDP. Nigeria needs to enhance its revenue base in terms of exports, diminishing dependence on imports; decreasing the importation of unimportant things, and boosting local production could reduce the issue caused by exchange rate volatility.

Test of Hypothesis

Hypothesis 1posits that: There is no significant relationship between exchange rate and project cost in Nigeria.

Table 6: Summary of ANOVA analysis on the relationship between the exchange rate and project cost in Nigeria

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	560.658	1	560.658	10.841	.000(a)
	Residual	10001.333	15	666.756		
	Total	10561.992	16			

a Predictors: (Constant), Project Cost b Dependent Variable: Exchange Rate

The result shows that the F value of 10.841 is significant at the 0.05 level, under 1 degree of freedom. Therefore, the null hypothesis is rejected because the P-value is less than 0.05. In conclusion, the study found a significant relationship between exchange rates and project costs in Nigeria.

The materials used in construction projects in Nigeria are mainly imported from other countries. The currency of the countries where some of these materials are sold has a better value when compared with the prevailing Nigerian currency. This invariably has led to spending more to acquire less, thereby, increasing the cost incurred on a project per time. Olowe (2009) noted that the Nigerian foreign exchange market is portrayed by high unpredictability; consequently, there is a continuous increase in the prices of construction materials, and project cost is affected. Dahiru and Joseph (2013) distinguished the exchange rate and its instability as key factors that impact the cost of completing a project.

5.0 Conclusion and Recommendations

There are different determinants of foreign exchange rate fluctuations which range from the construction cost index to the building cost index, labor index, material index, and equipment index. These determinants are traceable to project cost; however, the foreign exchange rate fluctuations determined by this index could affect road project cost. As the exchange rate fluctuates, it impacts the prices of road infrastructure development input materials. When the fluctuation is on the negative, there is increased project cost. However, the common situation is that of increased prices, and as such building project ends up absorbing the effect of the fluctuation in the foreign exchange rate.

Construction materials for infrastructure development projects used in Nigeria are mainly imported from other countries. With importation, there is a variation in the value of the currency. The floating and fluctuating foreign exchange rates continuously affect the cost of imported materials deployed for road infrastructure project construction. Fluctuation in foreign exchange rates to a large extent has contributed towards a continuous hike in road infrastructure project cost. Particularly, as the value of the naira is lower when compared with the currency value of the country where construction materials are imported from. It is recommended that policies be enacted to strengthen and stabilize the naira and reduce the disparity in the value of the Naira to foreign currencies. Policies directed towards strengthening the manufacturing sector to reduce import dependence of the road infrastructure development sector will ameliorate the impact of fluctuation in foreign exchange rates on the cost of road infrastructure development.

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